

(11) Japanese Patent Application

Laid-open (KOKAI) No. 2001-144767

(43) Laid-opened Date: May 25, 2001

(54) Title of the invention: DESTINATION APPARATUS

SELECTION METHOD FOR WIRELESS LAN

(21) Application Number: 11-319815

(22) Filing Date: November 10, 1999

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[Abstract]

[Problems to be Solved]

The invention provides a destination apparatus selection method for a wireless LAN by which a desired connection apparatus can be selected for communication from a plurality of connection apparatuses lying in a communication area of a connected apparatus.

[Solution]

Identification information on shape or name for specifying a connection apparatus (electronic camera 10) is displayed on display means 46 of a communication terminal 40 being a connected apparatus, and when a desired connection apparatus is specified from among the displayed contents 45, the connection apparatus and the communication terminal 40 automatically establish communication. Thus, a desired connection apparatus

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can be selected for communication from among multiple connection apparatuses lying in a communication area of the communication terminal 40.

[Claims for the Patent]

[Claim 1]

A destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus and at the same time, includes display means and specifying means, the method being characterized in that, when the connected apparatus and the connection apparatus enter a wireless communication area, communication starts automatically, the connected apparatus receives from the connection apparatus, identification information allowing identifying the connection apparatus, the identification information for identifying the connection apparatus is displayed on the display means of the connected apparatus, and when a desired connection apparatus is specified from among the displayed contents, wireless connection is established between the connection apparatus and the connected apparatus.

[Claim 2]

The destination apparatus selection method for a wireless LAN according to claim 1, characterized in that identification information for specifying a communicatable connection apparatus is displayed on the display means of the connected apparatus, and when a

desired connection apparatus is specified from among the displayed contents, communication between the connection apparatus and the connected apparatus is interrupted from that time on.

[Claim 3]

A destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus, the method being characterized in that wireless connection is established between the connection apparatus and the connected apparatus, depending on how a key arranged in the connection apparatus and a key arranged in the connected apparatus are pressed.

[Claim 4]

A destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus, the method being characterized in that, when a predetermined key arranged in the connection apparatus and a predetermined key arranged in the connected apparatus are pressed substantially around the same time, wireless connection is

established between the connection apparatus and the connected apparatus.

[Claim 5]

A destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus, the method being characterized in that, when a predetermined key arranged in the connection apparatus and a predetermined key arranged in the connected apparatus are pressed in a preliminarily set predetermined order, wireless connection is established between the connection apparatus and the connected apparatus.

[Claim 6]

A destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus, the method being characterized in that, when the connected apparatus receives sound unique to the connection apparatus emitted from the connection apparatus, wireless connection is established between the connection apparatus and the connected apparatus.

[Claim 7]

A destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication and photography; and a connected apparatus which can communicate wirelessly with the connection apparatus and at the same time, includes display means, the method being characterized in that, the connection apparatus takes a picture of contents displayed on the display means of the connected apparatus to detect the displayed contents of the connected apparatus, and when the displayed contents are predetermined ones, wireless connection is established between the connection apparatus and the connected apparatus.

[Claim 8]

A destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication and detection of vibration or impact sound; and a connected apparatus which can communicate wirelessly with the connection apparatus and at the same time, can detect vibration or impact sound, the method being characterized in that, when the connection apparatus is brought into contact with the connected apparatus, the connection apparatus and the connected apparatus identify each other to establish wireless connection.

[Claim 9]

A destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus and at the same time, includes notification means for emitting sound, light or vibration, the method being characterized in that, when the connection apparatus and the connected apparatus enter a communicatable area, wireless connection is automatically established, and when the establishing of wireless connection is achieved, sound, light or vibration is emitted from the notification means arranged in the connected apparatus to notify a user that wireless connection has been established.

[Claim 10]

A destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus, the method being characterized in that, when the connection apparatus and the connected apparatus enter a communicatable area, communication starts automatically; when the connection is first one, common key information to be used for authentication is transmitted to the connection apparatus, and when it is detected that a common key arranged in the connection

apparatus and a common key arranged in the connected apparatus have been pressed, wireless connection is established; when the connection is second one, predetermined key information to be used for authentication is transmitted to the connection apparatus, and when it is detected that a predetermined key arranged in the connection apparatus and a predetermined key arranged in the connected apparatus have been pressed, this is perceived as information for identifying a user, so that the communication is continued; and when the connection is third or later one, when it is detected that a predetermined key arranged in the connection apparatus and a predetermined key arranged in the connected apparatus have been pressed, a user is identified and at the same time, the communication is continued.

[Claim 11]

A destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus, the method being characterized in that: when the connection apparatus and the connected apparatus enter a communicatable area, mutual authentication is automatically performed to establish wireless connection; and a user can specify, by use of

specifying means arranged in the connected apparatus, from among a mode in which mutual authentication is limited to first one and a mode in which mutual authentication is also performed for the second time or more.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention relates to a destination apparatus selection method for a wireless LAN, and more particularly to a destination apparatus selection method for a wireless LAN by which information can be wirelessly transmitted to a plurality of connection apparatuses.

[0002]

[Conventional Art]

Japanese Patent Application Laid-Open No. 9-182156 has disclosed a mutual registration method by which, when PHS handsets communicate wirelessly with each other without involving the main phone, necessary information can be mutually registered.

[0003]

Also, Japanese Patent Application Laid-Open No. 5-167669 has disclosed a telephone system in which the name of the other party from which the telephone is received can be readily identified.

[0004]

[Problems to be Solved by the Invention]

According to the information registration method disclosed by Japanese Patent Application Laid-Open No. 9-182156, however, registration can be made only by one-to-one communication, and further an infrared communication port must be provided.

[0005]

According to the telephone system disclosed by Japanese Patent Application Laid-Open No. 5-167669, all that can be done is that the other party 's name corresponding to the received telephone number is searched for and displayed, and further mutual authentication between telephone sets is impossible, and only one-to-one communication is handled.

[0006]

The present invention has been achieved in view of these circumstances, and has an object to provide a destination apparatus selection method for a wireless LAN by which a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in a communication area of a connected apparatus.

[0007]

[Means for Solving the Problems]

To achieve the above object, according to the invention described in claim 1, there is provided a destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus and at the same time, includes display means and specifying means, the method being characterized in that, when the connected apparatus and the connection apparatus enter a wireless communication area, communication starts automatically, the connected apparatus receives from the connection apparatus, identification information allowing identifying the connection apparatus, the identification information for identifying the connection apparatus is displayed on the display means of the connected apparatus, and when a desired connection apparatus is specified from among the displayed contents, wireless connection is established between the connection apparatus and the connected apparatus.

[0008]

According to the present invention, when the connected apparatus and the connection apparatus enter a wireless communication area, communication starts automatically, the connected apparatus receives from the connection apparatus, identification information

allowing identifying the connection apparatus, and the identification information for identifying the connection apparatus is displayed on the display means of the connected apparatus, and when a desired connection apparatus is specified from among the displayed contents, wireless connection is established between the connection apparatus and the connected apparatus. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0009]

To achieve the above object, according to the invention described in claim 3, there is provided a destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus, the method being characterized in that wireless connection is established between the connection apparatus and the connected apparatus, depending on how a key arranged in the connection apparatus and a key arranged in the connected apparatus are pressed.

[0010]

According to the present invention, wireless connection is established between the connection apparatus and the connected apparatus, depending on how a key arranged in the connection apparatus and a key arranged in the connected apparatus are pressed. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0011]

To achieve the above object, according to the invention described in claim 4, there is provided a destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus, the method being characterized in that, when a predetermined key arranged in the connection apparatus and a predetermined key arranged in the connected apparatus are pressed substantially around the same time, wireless connection is established between the connection apparatus and the connected apparatus.

[0012]

According to the present invention, when a predetermined key arranged in the connection apparatus

and a predetermined key arranged in the connected apparatus are pressed substantially around the same time, wireless connection is established between the connection apparatus and the connected apparatus. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0013]

To achieve the above object, according to the invention described in claim 5, there is provided a destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus, the method being characterized in that, when a predetermined key arranged in the connection apparatus and a predetermined key arranged in the connected apparatus are pressed in a preliminarily set predetermined order, wireless connection is established between the connection apparatus and the connected apparatus.

[0014]

According to the present invention, when a predetermined key arranged in the connection apparatus and a predetermined key arranged in the connected

apparatus are pressed in a preliminarily set predetermined order, wireless connection is established between the connection apparatus and the connected apparatus. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0015]

To achieve the above object, according to the invention described in claim 6, there is provided a destination appratus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus, the method being characterized in that, when the connected apparatus receives sound unique to the connection apparatus emitted from the connection apparatus, wireless connection is established between the connection apparatus and the connected apparatus.

[0016]

According to the present invention, when the connected apparatus receives sound unique to the connection apparatus emitted from the connection apparatus, wireless connection is established between the connection apparatus and the connected apparatus. Thus, a desired connection apparatus can be selected

for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0017]

To achieve the above object, according to the invention described in claim 7, there is provided a destination appratus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication and photography; and a connected apparatus which can communicate wirelessly with the connection apparatus and at the same time, includes display means, the method being characterized in that, the connection apparatus takes a picture of contents displayed on the display means of the connected apparatus to detect the displayed contents of the connected apparatus, and when the displayed contents are predetermined ones, wireless connection is established between the connection apparatus and the connected apparatus.

[0018]

According to the present invention, the connection apparatus takes a picture of contents displayed on the display means of the connected apparatus to detect the displayed contents of the connected apparatus, and when the displayed contents are predetermined ones, wireless connection is established between the connection

apparatus and the connected apparatus. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0019]

To achieve the above object, according to the invention described in claim 8, there is provided a destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication and detection of vibration or impact sound; and a connected apparatus which can communicate wirelessly with the connection apparatus and at the same time, can detect vibration or impact sound, the method being characterized in that, when the connection apparatus is brought into contact with the connected apparatus, the connection apparatus and the connected apparatus identify each other to establish wireless connection.

[0020]

According to the present invention, when the connection apparatus is brought into contact with the connected apparatus, the connection apparatus and the connected apparatus identify each other to establish wireless connection. Thus, a desired connection apparatus can be selected for communication from among

multiple connection apparatuses lying in the communication area of the connected apparatus.

[0021]

To achieve the above object, according to the invention described in claim 9, there is provided a destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus and at the same time, includes notification means for emitting sound, light or vibration, the method being characterized in that, when the connection apparatus and the connected apparatus enter a communicatable area, wireless connection is automatically established, and when the establishing of wireless connection is achieved, sound, light or vibration is emitted from the notification means arranged in the connected apparatus to notify a user that wireless connection has been established.

[0022]

According to the present invention, when the connection apparatus and the connected apparatus enter a communicatable area, wireless connection is automatically established, and when the establishing of wireless connection is achieved, sound, light or vibration is emitted from the notification means

arranged in the connected apparatus to notify the user that wireless connection has been established. Thus, it can be easily perceived that a desired connection apparatus has been selected from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0023]

To achieve the above object, according to the invention described in claim 10, there is provided a destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus, the method being characterized in that: when the connection apparatus and the connected apparatus enter a communicatable area, communication starts automatically; when the connection is first one, common key information to be used for authentication is transmitted to the connection apparatus, and when it is detected that a common key arranged in the connection apparatus and a common key arranged in the connected apparatus have been pressed, wireless connection is established; when the connection is second one, predetermined key information to be used for authentication is transmitted to the connection apparatus, and when it is detected that a predetermined

key arranged in the connection apparatus and a predetermined key arranged in the connected apparatus have been pressed, this is perceived as information for identifying a user, so that the communication is continued; and when the connection is third or later one, when it is detected that a common key arranged in the connection apparatus and a common key arranged in the connected apparatus have been pressed, the user is identified and at the same time the communication is continued.

[0024]

According to the present invention, when the connection apparatus and the connected apparatus enter a communicatable area, communication starts automatically; when the connection is first one, common key information to be used for authentication is transmitted to the connection apparatus, and when it is detected that a common key arranged in the connection apparatus and a common key arranged in the connected apparatus have been pressed, wireless connection is established; when the connection is second one, predetermined key information to be used for authentication is transmitted to the connection apparatus, and when it is detected that a predetermined key arranged in the connection apparatus and a predetermined key arranged in the connected apparatus

have been pressed, the information is perceived as information for identifying the user, so that the communication is continued; and when the connection is third or later one, when it is detected that a predetermined key arranged in the connection apparatus and a predetermined key arranged in the connected apparatus have been pressed, a user is identified and at the same time, the communication is continued. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0025]

To achieve the above object, according to the invention described in claim 11, there is provided a destination apparatus selection method for a wireless LAN constituted of: a connection apparatus capable of wireless communication; and a connected apparatus which can communicate wirelessly with the connection apparatus, the method being characterized in that: when the connection apparatus and the connected apparatus enter a communicatable area, mutual authentication is automatically performed to establish wireless connection; and a user can specify, by use of specifying means arranged in the connected apparatus, from among a mode in which mutual authentication is

limited to first one and a mode in which mutual authentication is also performed for the second time or more.

[0026]

According to the present invention, when the connection apparatus and the connected apparatus enter a communicatable area, mutual authentication is automatically performed to establish wireless connection, and the user can specify, by use of specifying means arranged in the connection apparatus, from among a mode in which mutual authentication is limited to first one and a mode in which mutual authentication is also performed for the second time or more. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus and at the same time, unwanted communication can be prevented.

[0027]

[Embodiments of the Invention]

Preferred embodiments of a destination apparatus selection method for a wireless LAN according to the present invention will be described in detail with reference to the accompanying drawings.

[0028]

Figure 1 is a perspective view of an electronic camera being a connection apparatus capable of wirelessly connecting with a wireless communication terminal being a connection apparatus.

[0029]

Referring to Figure 1, a release button 2 and image taking lens 4 are arranged on a front face of the electronic camera 10.

[0030]

Figure 2 is a back view of the electronic camera 10 illustrated in Figure 1.

[0031]

Referring to Figure 2, arranged on a back face of the electronic camera 10 are a mode selection dial 6 for selecting any of the modes (photography, display, communication and the like) of the electronic camera 10, an arrow key 8 for specifying cursor movement displayed on display means 32 or giving a command for communication start-up, a finder 9, and the display means 32.

[0032]

Figure 3 is a block diagram of the electronic camera 10 illustrated in Figure 1.

[0033]

Arranged in the electronic camera 10 are: imaging means 12 in which a subject image is focused on a

photo-detecting surface, and photoelectrically converted, and outputted as image data; a buzzer 13; information processing means 14 which controls the whole electronic camera 10 and at the same time, controls image data sampling timing, image data recording, image data figure recognition, image data blink recognition, reading of model information of the electronic camera 10, communication, and displaying; vibration detection means 15 which detects vibration change and acceleration exerted on the electronic camera 10; image processing means 16 which performs processes such as image size modification, sharpness correction, gamma correction, contrast correction, and white balance correction; a frame memory 18 which temporarily stores image data; input means 19 in which the release button 2, communication button, transmission button, function switch, arrow key 8, determination switch, mode selection switch and the like are arranged; compression/decompression means 20 which compresses information such as image data, by a technique as typified by JPEG and motion JPEG, or expands compressed data; and recording medium interface 24 which converts data to record or read data to/from a detachable recording medium 22. The recording medium 22 is a detachable recording medium as typified by a

semiconductor such as a memory card or MO, magnetic recording medium, and optical recording medium.

[0034]

Connected to the information processing means 14 is a memory 26 constituted of a ROM having stored therein an operating program and various types of constants and a RAM being storage means acting as a working area during program execution.

[0035]

Wireless communication means of the electronic camera 10 used to transmit/receive data such as image data, via communication to/from an external apparatus, is constituted of transmission/reception means 28 for modulating carrier wave to transmit/receive image data in response to a command from the information processing means 14 and an antenna 30 via which the carrier wave and data are transmitted/received.

[0036]

Also, arranged in the electronic camera 10 are a D/A converter 34 for displaying image data on the display means 32 and a character generator 36 which converts code information supplied from the information processing means 14 into character or message data to be displayed.

[0037]

The imaging processing of the electronic camera 10 having the above configuration will be described.

[0038]

An image to be captured is focused on the photo-detecting surface of the imaging means 12, and the focused subject image is photoelectrically converted and outputted to the image processing means 16. The resultant image data is subjected to processings of amplification and noise reduction by the image processing means 16, and then temporarily stored in the frame memory 18. The information processing means 14 sequentially transfers the image data stored in the frame memory 18 to the D/A converter 34, so that the image data is displayed on the display means 32.

[0039]

When the release button 2 arranged in the input means 19 is pressed, the camera changes to a subject image taking mode. Then, the information processing means 14 transfers the image data stored in the frame memory 18 to the compression/decompression means 20 and outputs a command of compressing image data under a predetermined condition, and then causes the recording medium interface 24 to sequentially store the image data into the recording medium 22. When the transmission button arranged in the input means 19 is pressed after establishing communication with a

communication terminal, the information processing means 14 sequentially reads specified image data from the recording medium 22, and after converting the data into a predetermined data format, executes a processing of transmitting the resultant data via the transmission/reception means 28 and antenna 30 to the external communication terminal.

[0040]

Figure 4 is an external view of a communication terminal being a connected apparatus.

[0041]

As illustrated in Figure 4, the communication terminal 40 is constituted of: an antenna 42 used to wirelessly communicate with the public line; wireless communication means 44 used to wirelessly communicate with a connection apparatus; display means 46 for displaying communication information and display contents 45; specifying means 48, 48 ... for specifying or selecting a telephone number, character, picture or sound data, and for specifying an apparatus, address and the like to which the above data is to be outputted; a loudspeaker 50 which acts as a telephone receiver and at the same time outputs sound; and a microphone 52 which receives voice or impact sound.

[0042]

Figure 5 is a block diagram of the communication terminal being a connected apparatus.

[0043]

Referring to Figure 5, the transmission/reception unit of the communication terminal 40 is constituted of: public line wireless communication means 54 for wirelessly communicating with the public line; public line transmission/reception means 56; wireless communication means 44 for wirelessly communicating with a connection apparatus; transmission/reception means 58; and transmission/reception buffer 60 which temporarily stores data transmitted/received in real-time.

[0044]

There are also arranged: a CPU 62 which controls the whole communication terminal 40; a PROM 64 in which a program for operating the CPU 62, various types of constants, telephone numbers, destination addresses, information on appearance and product name of a connection apparatus to be wirelessly connected, and other data are written; and a RAM 66 being storage means acting as a working area when the CPU 62 executes processings.

[0045]

The CPU 62 of the communication terminal 40 and peripheral circuits including the display means 46 and

specifying means 48 are connected via communication means such as a bus line and I/O, so that the CPU 62 can control the peripheral circuits. Also, the CPU 62 can control blinking of figures, characters and backlight displayed on the display means 46.

[0046]

The communication means of the wireless communication means 44 uses radio wave, ultrasonic wave or light such as infrared. When radio wave is used, the specification of the communication means may be compatible with "Bluetooth" or wireless LAN (Local Area network) which is recently attracting attention; when infrared is used, the specification may be compatible with IrDA.

[0047]

The above description was given by taking as an example, a case where an electronic camera is used as the connection apparatus, but the connection apparatus may be a personal computer, camera, printer or the like as long as they include the display means, storage means, output means and the like. Also, the communication terminal may be a commonly used mobile communication unit such as a mobile phone or PHS, or an apparatus such as an electronic camera or printer.

[0048]

Figure 6 illustrates a program flowchart when communication between the electronic camera 10 and communication terminal 40 is established.

[0049]

When the electronic camera 10 and communication terminal 40 mutually enter a communication area, the two apparatuses recognize this, and the program of the electronic camera 10 branches to step S100 "START" (hereinafter, "S100" for short). Subsequently, in step S102 "start research mode", radio wave containing a search signal is radiated from the antenna 30 according to a command of the information processing means 14, whereby a processing of searching for the communication terminal 40 starts.

[0050]

In S104 "connectable apparatus exists?", if the electronic camera 10 receives a search signal outputted from the communication terminal 40, the electronic camera 10 receives the unique address from the communication terminal 40 to establish communication, and starts a processing of entering a new communication network and performing a connection handshake. In this case, the fact that communication is under way, and information such as apparatus name and the like of the other party's connection apparatus or communication terminal may be displayed on the display means 32, so

that the user can select a desired apparatus from among these.

[0051]

In S106 "connection acknowledgement received?", there is performed a processing of waiting for a "connection acknowledgement" signal to be wirelessly transmitted from the communication terminal 40 to the electronic camera 10. If the "connection acknowledgement" is not received, S106 is repeated; if the "connection acknowledgement" is received, the operation proceeds to S108 "↑key pressed?".

[0052]

Subsequently, in S108 "↑key pressed?", it is determined whether or not "↑key" of the arrow key 8 arranged in the input means 19 has been pressed. If it is determined that "↑key" has not been pressed, the operation proceeds to S110 "send no-key reply", so that a command indicating that "↑key" has not been pressed is sent to the communication terminal 40. And the operation proceeds to S118 "END".

[0053]

Meanwhile, in S108, when it is determined that "↑key" has been pressed, the operation proceeds to S112 "send pressed-key reply", so that a command indicating that "↑key" has been pressed is sent to the communication terminal 40. Subsequently, in S114

"connection permission received?", if it is determined that "connection permission" has not been received from the communication terminal 40, S114 is repeated; if it is determined that "connection permission" has been received from the communication terminal 40, the operation proceeds to S116 "authentication procedure", so that communication for authentication procedure is performed. Then, in S118 "END", the processing of communication connection with the communication terminal 40 is completed, and the operation returns to the original program routine.

[0054]

Meanwhile, in the processing program of the communication terminal 40, the following operation is performed. When the electronic camera 10 and the communication terminal 40 mutually enter a communication area, the two apparatuses recognize this, and the program of the communication terminal 40 branches to S120 "START". Subsequently, in step S122 "start research mode", the CPU 62 causes the wireless communication means 44 to radiate radio wave containing a search signal, whereby a processing of searching for a connection apparatus starts. In this case, information such as the apparatus name and the like of the electronic camera 10 which is under communication, or information such as the name of a connection

apparatus which lies in another communication area in a communicatable manner, may be displayed, so that the user can select a desired party from among the displayed ones.

[0055]

In S124 "communicatable apparatus exists?", if the communication terminal 40 receives a search signal outputted from the electronic camera 10, the communication terminal 40 identifies the communication terminal 40 which has entered the new communication network, and assigns a unique address to the communication terminal 40 to start a processing of performing a connection handshake, whereby communication is established.

[0056]

In S126 "↑key pressed?", it is determined whether or not "↑key" of the arrow key 8 arranged in the specifying means 48 has been pressed. If it is determined that "↑key" has not been pressed, S126 is repeated; if it is determined that "↑key" has been pressed, the operation proceeds to S128 "transmit connection acknowledgement".

[0057]

Subsequently, in S128, the communication terminal 40 wirelessly transmits to the electronic camera 10, a command "connection acknowledgement" indicating that

communication is to be established. Then, the operation proceeds to S130 "pressed-key received?". In S130, it is determined whether or not "↑key" of the communication terminal 40 and "↑key" of the electronic camera 10 has been simultaneously pressed. When the electronic camera 10 transmits in S110 "send no-key reply", a command indicating that "↑key" has not been pressed and the communication terminal 40 receives this, the operation proceeds from S130 to S136 "END", so the present subroutine is finished.

[0058]

Also, when the electronic camera 10 sends in S112 "send pressed-key reply", a command indicating that "↑key" has been pressed and the communication terminal 40 receives this, the operation proceeds from S130 to S132 "transmit connection permission". Subsequently, in S132 "transmit connection permission", the communication terminal 40 transmits to the electronic camera 10, a communication connection permission signal. Thereafter, the electronic camera 10 and the communication terminal 40 communicate with each other and thereby establish mutual authentication in S134 "authentication procedure".

[0059]

After completion of the above authentication procedure, in S136 "END", the procedure of connection

with the electronic camera 10 is completed, and the operation returns to the original subroutine.

[0060]

As described above, when "↑key" of the arrow key arranged in the communication terminal 40 and "↑key" of the arrow key arranged in the electronic camera 10 are simultaneously pressed, the communication terminal 40 transmits an inquiry of whether or not the key has been pressed, to a connection apparatus lying in a wireless communication area, and when a reply from the connection apparatus indicating that the key has been pressed is received, executes a mutual authentication procedure, whereby mutual recognition is performed and at the same time, communication is established. Also, the manipulated key is not limited to "↑key"; when one or more prescribed keys are used, different keys may be pressed to give a command of executing mutual authentication.

[0061]

Figure 7 illustrates a flowchart according to another embodiment when the electronic camera 10 and communication terminal 40 establish communication therebetween.

[0062]

When the electronic camera 10 and the communication terminal 40 mutually enter a

communication area, the two apparatuses recognize this, and the program of the electronic camera 10 branches to S200 "START". Subsequently, in S202 "start key setting", there is started a processing of setting the order in which a key is pressed which corresponds to ID used for the user to specify a connection apparatus to establish communication. In this case, the setting effect, setting method and procedure may be displayed on the display means 32, so that the user can select from among these.

[0063]

In S204 "key pressed?", it is determined whether or not any key arranged in the input means 19 has been pressed. If it is determined that no key has been pressed, the operation proceeds to S208 "key setting completed?". If it is determined that some key has been pressed, the operation proceeds to S206 "store key order", in which the order of keys pressed is stored, and then the operation proceeds to S208.

[0064]

In S208, it is determined whether or not the setting of key-pressing order has been completed. The determination of whether or not the setting of key-pressing order has been completed, may be based on the fact that the key has been pressed at predetermined times, or based on timeout, or based on the fact that a

prescribed key has been pressed to give a command of completing the key setting. If it is determined that the key setting has been completed, the operation proceeds to S210 "start search mode"; if it is determined that the key setting has not been completed, the operation returns to S204, thus waiting for a subsequent key to be pressed.

[0065]

In S210, radio wave containing a search signal is radiated via the antenna 30 according to a command from the information processing means 14, whereby a processing of searching for the communication terminal 40 starts. Subsequently, in S212 "communicatable apparatus exists?", if the electronic camera 10 receives a search signal outputted from the communication terminal 40, the electronic camera 10 receives a unique address from the communication terminal 40 to establish communication, and starts a processing of entering a new communication network for the first time to perform a connection handshake. In this case, the fact that communication with the display means 32 is under way, and information such as the apparatus name of the other party's connection apparatus or communication terminal may be displayed, so that the user can select a desired apparatus from among these.

[0066]

Subsequently, in S214 "key order received?", there is performed a processing of waiting for the information on key order which has been inputted by the user through the specifying means 48 of the communication terminal 40 to be transmitted. If the key order is received, the operation proceeds to S216 "identical order?".

[0067]

In S216, there is performed a processing of comparing the key order which the information processing means 14 has inputted at the electronic camera 10, with that received from the communication terminal 40; if they don't agree with each other, the operation proceeds to S218 "send discrepancy reply", in which a command is transmitted to the communication terminal 40 to indicate that the key pressing order is different, and then the operation proceeds to S226 "END". In S216, if the key pressing order is identical, the operation proceeds to S220 "send correspondence reply", in which a command is transmitted to the communication terminal 40 to indicate that the key pressing order is identical, and then the operation proceeds to S222 "connection permission received?".

[0068]

In S222, there is performed a processing of waiting for a signal of permitting connection to the electronic camera 10 to be wirelessly received from the communication terminal 40; if "connection permission" is not received, S222 is repeated; if "connection permission" is received, the operation proceeds to S224 "authentication procedure", in which communication for authentication procedure is performed. Then, in S226 "END", the processing of connecting to the communication terminal 40 is completed, returning to the original program.

[0069]

Meanwhile, in the processing program of the communication terminal 40, the following operation is performed. When the electronic camera 10 and the communication terminal 40 mutually enter a communication area, the two apparatuses recognize this, and the program of the electronic camera 10 branches to S230 "START". Subsequently, in step S232 "start research mode", the CPU 62 starts up the transmission/reception means 58 and causes radio wave containing a search signal to be radiated from the wireless communication means 44, whereby a processing of searching for a connection apparatus starts. Subsequently, in S234 "connectable apparatus exists?", if the communication terminal 40 receives a search

signal outputted from the electronic camera 10, the communication terminal 40 identifies the electronic camera 10 which has entered the new wireless communication network and assigns a unique address to the electronic camera 10 to start a processing of performing a connection handshake, whereby communication is established.

[0070]

In the following steps, there is started a processing in which the user specifies a connection apparatus and inputs information corresponding to ID used to establish communication. In this case, the effect of the setting, setting method and the procedure may be displayed on the display means 32, so that the user can select from among these.

[0071]

In S236 "key pressed?", it is determined whether or not any key arranged in the specifying means 48 has been pressed; if it is determined that no key has been pressed, the operation proceeds to S240 "key setting completed?"; if it is determined that some key has been pressed, the operation proceeds to S238 "store key order", in which the order of keys newly pressed is stored, and then the operation proceeds to S240.

[0072]

In S240, it is determined whether or not the setting of key-pressing order has been completed. The determination of whether or not the setting of key-pressing order has been completed, may be based on the fact that the key has been pressed at predetermined times, or based on timeout, or based on the fact that a prescribed key has been pressed to give a command of completing the key setting. If it is determined that the key setting has been completed, the operation proceeds to S242 "transmit key order"; if it is determined that the key setting has not been completed, the operation proceeds to S236, thus waiting for a subsequent key to be pressed.

[0073]

In S242, there is executed a processing of transmitting the inputted key order to the electronic camera 10 being a connection apparatus, and then the operation proceeds to S244 "correspondence received?". In S244, there is executed a processing of receiving a determination result for the key order which has been transmitted to the electronic camera 10 and making determination based on the result to modify the branching destination of the processing of the communication terminal 40; if the received command indicates "discrepancy", the processing proceeds to S250 "END"; if the received command indicates

"correspondence", the operation proceeds to S246 "transmit connection permission".

[0074]

Subsequently, in S246 "transmit connection permission", the communication terminal 40 transmits a signal of permitting communication connection to the electronic camera 10. Thereafter, the electronic camera 10 and communication terminal 40 communicates with each other, and establish mutual authentication in S248 "authentication procedure".

[0075]

After completion of the above authentication procedure, in S250 "END", the procedure of connection with the electronic camera 10 is completed, and the operation returns to the original program routine.

[0076]

As described above, keys arranged in the communication terminal 40 are pressed in the key order preliminarily set in the electronic camera 10, and the information on this key order is transmitted to the electronic camera 10, and the electronic camera 10 sends a reply of a result of determination of whether or not this key order agrees with the preliminarily set order, and the communication terminal 40 receives this information, and if this information indicates correspondence, mutual authentication is performed and

at the same time, communication can be established. The key-pressing order may be set in an easily comprehensible manner, for example, in order of "↑, →, ↓, ←" of the arrow key. Also, the manipulated keys are not limited to particular ones; when one or more prescribed keys are used, different keys may be pressed plural times to give a command of executing mutual authentication.

[0077]

Figure 8 illustrates a flowchart according to another embodiment when the electronic camera 10 and communication terminal 40 establish communication.

[0078]

When the electronic camera 10 and communication terminal 40 mutually enter a communication area, the two apparatuses recognize this, and the program of the electronic camera 10 branches to step S300 "START". Subsequently, in step S302 "start research mode", radio wave containing a search signal is radiated from the antenna 30 according to a command of the information processing means 14, whereby a processing of searching for the communication terminal 40 starts.

[0079]

In S304 "connectable apparatus exists?", if the electronic camera 10 receives a search signal outputted from the communication terminal 40, the electronic

camera 10 receives a unique address from communication terminal 40 to establish communication, and starts a processing of entering a new communication network and performing a connection handshake. In this case, the fact that communication is under way, and information such as apparatus name and the like of the other party's connection apparatus or communication terminal may be displayed on the display means 32, so that the user can select from among these.

[0080]

In S306 "connection acknowledgement received?", there is performed a processing of waiting for a "connection acknowledgement" signal to be wirelessly transmitted from the communication terminal 40 to the electronic camera 10. If "connection acknowledgement" is not received, S306 is repeated; if "connection acknowledgement" is received, the operation proceeds to S308 "ring buzzer", in which a buzzer is ringed at a given interval of time toward the communication terminal 40. When the connection apparatus is the electronic camera 10, a buzzer 13 used for a self timer or the like is ringed for notification.

[0081]

Subsequently, in S310 "buzzer acknowledged?", there is performed a processing of waiting for "buzzer acknowledgement" information indicating that the buzzer

sound emitted by the electronic camera 10 has been received by the communication terminal 40 to be received by the electronic camera 10; if "buzzer acknowledgement" has not been received, S310 is repeated; if "buzzer acknowledgement" has been received, the operation proceeds to S312 "buzzer reply", in which "buzzer reply" indicating reception of "buzzer acknowledgement" is transmitted to the communication terminal 40.

[0082]

Subsequently, in S314 "connection permission received?", if "connection permission" has not been received from the communication terminal 40, S314 is repeated; if "connection permission" has been received from the communication terminal 40, the operation proceeds to S316 "authentication procedure", in which communication for authentication procedure is performed. Then, in S318 "END", the processing of communication connection with the communication terminal 40 is completed, and the operation returns to the original program routine.

[0083]

Meanwhile, in the processing program of the communication terminal 40, the following operation is performed. When the electronic camera 10 and the communication terminal 40 mutually enter a

communication area, the two apparatuses recognize this, and the program of the communication terminal 40 branches to S320 "START". Subsequently, in step S322 "start research mode", the CPU 62 causes the wireless communication means 44 to radiate radio wave containing a search signal, whereby a processing of searching for a connection apparatus starts. In this case, information such as the apparatus name and the like of the electronic camera 10 which is under communication, or information such as the name of a connection apparatus which lies in another communication area in a communicatable manner, may be displayed, so that the user can select a desired party from among the displayed ones.

[0084]

In S324 "connectable apparatus exists?", if the communication terminal 40 receives a search signal outputted from the electronic camera 10, the communication terminal 40 identifies the communication terminal 40 which has entered the new communication network, and assigns a unique address to the communication terminal 40 to start a processing of performing a connection handshake, whereby communication is established.

[0085]

In S326 "start key pressed?", it is determined whether or not a start key arranged in the specifying means 48 has been pressed. This start key may be a dedicated start key, or "↑key" of the arrow key 8 may be used. If it is determined that "start key" has not been pressed, S326 is repeated; if it is determined that "start key" has been pressed, the operation proceeds to S328 "transmit connection acknowledgement".

[0086]

Subsequently, in S328, the communication terminal 40 wirelessly transmits to the electronic camera 10, a command "connection acknowledgement" indicating that communication is to be established. Then, the operation proceeds to S330 "buzzer sound detected?". In S330, if it is determined that the buzzer sound emitted by the electronic camera 10 has not been detected, S330 is repeated. In S330, if it is determined that the buzzer sound emitted by the electronic camera 10 has been detected, the operation proceeds to S332 "transmit buzzer acknowledgement", in which information indicating reception of the buzzer sound is transmitted to the electronic camera 10. Subsequently, the operation proceeds to S334 "buzzer reply?".

[0087]

In S334, it is determined whether or not the "buzzer reply" information transmitted by the electronic camera 10 in S312 has been received; if it is determined that "buzzer reply" has not been received, the operation proceeds to S340 "END"; if it is determined that "buzzer reply" has been received, the operation proceeds to S336 "transmit connection permission".

[0088]

Subsequently, in S336 "transmit connection permission", the communication terminal 40 transmits a signal of permitting communication connection to the electronic camera 10. Thereafter, the electronic camera 10 and communication terminal 40 communicate with each other, and establish mutual authentication in S338 "authentication procedure".

[0089]

After completion of the above authentication procedure, in S340 "END", the procedure of connection with the electronic camera 10 is completed, and the operation returns to the original program routine.

[0090]

As described above, when a desired connection apparatus is selected based on the information on connection apparatus displayed in the communication terminal 40, buzzer sound is emitted by the selected

connection apparatus, and the microphone 52 of the communication terminal 40 detects this buzzer sound, and then the communication terminal 40 makes through wireless communication, an inquiry to an apparatus lying in the communication connection area, about whether or not the apparatus is ringing the buzzer. When a reply indicating that the apparatus is ringing the buzzer is received, a mutual authentication procedure is executed to establish communication. Also, when buzzer sound is emitted from multiple connection apparatuses, communication may be established only with a connection apparatus brought close to the communication terminal 40.

[0091]

Figure 9 illustrates a flowchart according to another embodiment when the electronic camera 10 and communication terminal 40 establish communication.

[0092]

When the electronic camera 10 and communication terminal 40 mutually enter a communication area, the two apparatuses recognize this, and the program of the electronic camera 10 branches to step S400 "START". Subsequently, in step S402 "start research mode", radio wave containing a search signal is radiated from the antenna 30 according to a command of the information

processing means 14, whereby a processing of searching for the communication terminal 40 starts.

[0093]

Subsequently, the operation proceeds to S404 "prohibit strobe, micro position, movie through", in which the operating mode of the electronic camera 10 is set. Thereafter, the operation proceeds to S406 "connection acknowledgement figure". In S406, using the electronic camera 10, the user takes a picture of "connection acknowledgement figure" displayed on the display means 46 of the communication terminal 40, so that the electronic camera 10 captures a display pattern and blinking state and thereby identifies the communication terminal 40.

[0094]

In S406, if "connection acknowledgement figure" is identified, the operation proceeds to S408 "stop movie through", in which the movie through mode which has been set in the above step S404 is stopped. Then, in S410 "transmit figure identification", information indicating that the figure displayed on the display means 46 has been identified, is transmitted to the communication terminal 40, and then the operation proceeds to S412 "connection permission received?".

[0095]

In S412 "connection permission received?", if it is determined that "connection permission" has not been received from the communication terminal 40, S412 is repeated; if it is determined that "connection permission" has been received from the communication terminal 40, the operation proceeds to S414 "authentication procedure", in which communication for authentication procedure is performed. Then, in S416 "END", the processing of communication connection with the communication terminal 40 is completed, and the operation returns to the original program routine.

[0096]

Meanwhile, in the processing program of the communication terminal 40, the following operation is performed. When the electronic camera 10 and the communication terminal 40 mutually enter a communication area, the two apparatuses recognize this, and the program of the communication terminal 40 branches to S420 "START". Subsequently, in step S422 "start research mode", the CPU 62 causes the wireless communication means 44 to radiate radio wave containing a search signal, whereby a processing of searching for a connection apparatus starts. In this case, information such as the apparatus name and the like of the electronic camera 10 which is under communication, or information such as the name of a connection

apparatus which lies in another communication area in a communicatable manner, may be displayed, so that the user can select a desired party from among the displayed ones.

[0097]

After completion of the connection apparatus search, the operation proceeds to S424 "display connection acknowledgement figure", in which a prescribed display pattern is displayed on the display means 46, and then operation proceeds to S426 "acknowledgement detected?". In S426, there is performed a processing of waiting for the "figure identification" signal transmitted from the electronic camera 10. In S426, if it is determined that "figure identification" has not been received, S426 is repeated; if it is determined that "figure identification" has been received, the operation proceeds to S428 "transmit connection permission".

[0098]

Subsequently, in S428, the communication terminal 40 transmits a signal of permitting communication connection to the electronic camera 10. Thereafter, the electronic camera 10 and communication terminal 40 communicate with each other, and then in S430 "authentication procedure", mutual authentication is established.

[0099]

After completion of the above authentication procedure, in S432 "END", the procedure of connection with the electronic camera 10 is completed, and the operation returns to the original program routine.

[0100]

Figure 10 illustrates the electronic camera 10 taking a picture of "identification figure" displayed on the display means 46 of the communication terminal 40.

[0101]

As illustrated in Figure 10, the mode of the electronic camera 10 is automatically set to "identification mode", so that "identification figure" displayed on the display means 46 of the communication terminal 40 is identified. Consequently, mutual identification procedure is executed and at the same time, communication is established. The identification figure may be a character pattern or may be a pictorial figure pattern.

[0102]

Figure 11 illustrates a flowchart according to another embodiment when the electronic camera 10 and communication terminal 40 illustrated in Figure 9 establish communication therebetween. The connection acknowledgement method illustrated in Figure 9 is

through "figure identification", but the connection acknowledgement method illustrated in Figure 11 is through "blinking period identification".

[0103]

Only parts of the flowchart of Figure 11 different from those of the flowchart of Figure 9 will be described, and an explanation of corresponding parts is omitted.

[0104]

The difference from the processing program of the electronic camera 10 illustrated in Figure 9 lies in that, instead of the processing executed in S406 "connection acknowledgement figure" of Figure 9 in which a display pattern or blinking state displayed on the display means 46 is captured to identify the communication terminal 40, "connection acknowledgement blinking display" displayed on the display means 46 is captured to identify a blinking period in S407 "acknowledgement blinking period?". The subsequent processing is performed similarly to the one illustrated in Figure 9.

[0105]

The difference from the processing program of the communication terminal 40 illustrated in Figure 9 lies in that, instead of displaying "connection acknowledgement figure" in S424 in Figure 9 "display

connection acknowledgement figure", the displayed figure is blinked at a predetermined interval of time, and that there is added a processing of S427 "stop blink" in which the blink produced in S425 is stopped in response to identification detection in S426.

[0106]

When the blinking period displayed on the display means 46 is identified, the mutual authentication procedure is executed and at the same time, communication is established. The blink acknowledgement figure may be a character pattern or may be a pictorial figure pattern.

[0107]

Figure 12 illustrates a flowchart according to another embodiment when the electronic camera 10 and communication terminal 40 establish communication.

[0108]

When the electronic camera 10 and the communication terminal 40 mutually enter a communication area, the two apparatuses recognize this, and the program of the electronic camera 10 branches to S500 "START". Subsequently, in step S502 "start research mode", radio wave containing a search signal is radiated from the antenna 30 according to a command of the information processing means 14, whereby a

processing of searching for the communication terminal 40 starts.

[0109]

Subsequently, in S504 "start monitoring vibration", there is started a processing of monitoring vibration data outputted from the vibration detection means 15 by enabling the vibration detection means 15.

Subsequently, in S506 "impact detected?", by monitoring the vibration data outputted from the vibration detection means 15, it is determined whether or not an impact value produced when the electronic camera 10 and communication terminal 40 come into contact with each other has been identified as vibration; if no impact has been detected, S506 is repeated; if an impact has been detected, the operation proceeds to S508 "stop monitoring vibration", in which the vibration detection means 15 is disabled to stop monitoring vibration data.

[0110]

Subsequently, in S510 "transmit impact identification", there is performed a processing of transmitting to the communication terminal 40, "impact identification" information indicating that an impact has been detected. Then, the operation proceeds to S512 "connection permission received?".

[0111]

Subsequently, in S512 "connection permission received?", if it is determined that "connection permission" has not been received from the communication terminal 40, S512 is repeated; if it is determined that "connection permission" has been received from the communication terminal 40, the operation proceeds to S514 "authentication procedure", in which communication for authentication procedure is performed. Then, in S516 "END", the processing of communication connection with the communication terminal 40 is completed, and the operation returns to the original program routine.

[0112]

Meanwhile, in the processing program of the communication terminal 40, the following operation is performed. When the electronic camera 10 and the communication terminal 40 mutually enter a communication area, the two apparatuses recognize this, and the program of the communication terminal 40 branches to S520 "START". Subsequently, in step S522 "start research mode", the CPU 62 causes the wireless communication means 44 to radiate radio wave containing a search signal, whereby a processing of searching for a connection apparatus starts. In this case, information such as the apparatus name and the like of the electronic camera 10 which is under communication,

or information such as the name of a connection apparatus which lies in another communication area in a communicatable manner, may be displayed, so that the user can select a desired party from among the displayed ones.

[0113]

After completion of searching for a connection apparatus, the operation proceeds to S524 "monitor microphone input", in which a processing of monitoring impact sound inputted from the microphone 52 starts. Then, the operation proceeds to S526 "impact sound detected?", in which it is determined whether or not impact sound having a predetermined or more frequency or having a predetermined or more sound magnitude has been detected; if it is determined that no impact sound has been detected at the microphone input, S526 is repeated; if it is determined that impact sound has been detected at the microphone input, the operation proceeds to S528 "impact identification detected?".

[0114]

Subsequently, in S528 "impact identification detected?", it is determined whether or not "impact identification" has been received from the electronic camera 10; if it is determined that "impact identification" has not been received from the electronic camera 10, S528 is repeated; if it is

determined that "impact identification" has been received from the electronic camera 10, the operation proceeds to S530 "transmit connection permission".

[0115]

Subsequently, in S530, the communication terminal 40 transmits a signal of permitting communication connection to the electronic camera 10. Thereafter, the electronic camera 10 and communication terminal 40 communicate with each other, and mutual authentication is established in S532 "authentication procedure".

[0116]

After completion of the above authentication procedure, in S534 "END", the procedure of connection with the electronic camera 10 is completed, and the operation returns to the original program routine.

[0117]

As described above, the electronic camera 10 is automatically set to the impact identification mode, and when the electronic camera 10 and communication terminal 40 are brought into contact with each other so that small contact sound is produced, the communication terminal 40 detects contact sound through the microphone 52 and at the same time, the electronic camera 10 detects impact caused by the contact through the vibration detection means 15, and the processing of mutual authentication is executed, and communication is

established. As the contact detection means, a sensor for detecting hand movement during photography may be used, or a variation in conductivity or a variation in capacitance may be detected, or a variation in distance between the electronic camera 10 and communication terminal 40 may be detected using an autofocus system.

[0118]

Figure 13 illustrates a flowchart according to another embodiment when the electronic camera 10 and communication terminal 40 establish communication.

[0119]

When the electronic camera 10 and communication terminal 40 mutually enter a communication area, the two apparatuses recognize this, and the program of the electronic camera 10 branches to step S600 "START". Subsequently, in step S602 "start research mode", radio wave containing a search signal is radiated from the antenna 30 according to a command of the information processing means 14, whereby a processing of searching for the communication terminal 40 starts. If the electronic camera 10 receives the search signal outputted from the communication terminal 40, the electronic camera 10 receives a unique address from the communication terminal 40 to establish communication, and starts a processing of entering a new communication network and performing a connection handshake. In this

case, the fact that communication is under way, and information such as apparatus name and the like of the other party's connection apparatus or communication terminal 40 may be displayed on the display means 32, so that the user can select a desired apparatus from among these.

[0120]

In S604 "product name request?", there is performed a processing of waiting for a request for transmission of attributes such as the product name of the electronic camera 10 to be wirelessly received from the communication terminal 40; if the transmission request has not been received, S604 is repeated; if the transmission request has been received, the operation proceeds to S606 "transmit product name", in which information on the product name of the electronic camera 10 is transmitted.

[0121]

Subsequently, in S608 "connection permission received?", there is performed a processing of waiting for "permission for connection" with the electronic camera 10 to be wirelessly received from the communication terminal 40; if "connection permission" has not been received, S608 is repeated; if "connection permission" has been received, the operation proceeds to S610 "authentication procedure", in which

communication for authentication procedure is performed. Then, in S612 "END", the processing of connection with the communication terminal 40 is completed, and the operation returns to the original program routine.

[0122]

Meanwhile, in the processing program of the communication terminal 40, the following operation is performed. When the electronic camera 10 and the communication terminal 40 mutually enter a communication area, the two apparatuses recognize this, and the program of the communication terminal 40 branches to S620 "START". Subsequently, in step S622 "start research mode", the CPU 62 causes the wireless communication means 44 to radiate radio wave containing a search signal, whereby a processing of searching for a connection apparatus starts. In this case, information such as the apparatus name and the like of the electronic camera 10 which is under communication, or information such as the name of a connection apparatus which lies in another communication area in a communicatable manner, may be displayed, so that the user can select a desired apparatus from among the displayed ones.

[0123]

In S624 "transmit product name request", the communication terminal 40 requests the electronic

camera 10 for transmission of attributes such as product name. Subsequently, in S626 "product name received?", there is performed a processing of waiting for information on the product name of the electronic camera 10 to be received from the electronic camera 10; if "product name" has not been received, S626 is repeated; if "product name" has been received, the operation proceeds to S628 "display product name".

[0124]

Subsequently, in S628 "display product name", identification information such as the appearance, name and the like of the connection apparatus stored in the PROM 64 is displayed on the display means 46.

[0125]

Figure 14 illustrates the display contents 45 of identification information of the connection apparatus displayed on the display means 46 of the communication terminal 40.

[0126]

Referring to Figure 14, displayed on the display means 46 of the communication terminal 40 are remaining battery charge display 82 indicating remaining charge of a battery being the power source of the communication terminal 40, received radio wave intensity display 84 indicating wirelessly received radio wave intensity, connection apparatus name display

86, 86 . . . , and inverted display 88 used to select the electronic camera 10 being a connection apparatus.

[0127]

Subsequently, in S630 "↑key pressed?", it is determined whether or not "↑key" arranged in the specifying means 48 has been pressed; if it is determined that "↑key" has been pressed, the operation proceeds to S632 "display UP", in which the inverted display 88 currently displayed on the display means 46 is moved up to an adjacent connection apparatus name display 86. Then, after completion of moving the inverted display 88, the operation proceeds to S638 "setting key pressed?".

[0128]

In S630 "↑key pressed?", if it is determined that "↑key" has not been pressed, the operation proceeds to S634 "↓key pressed?", in which it is determined whether or not "↓key" arranged in the specifying means 48 has been pressed; if it is determined that "↓key" has been pressed, the operation proceeds to S636 "display DOWN", in which the inverted display 88 currently displayed on the display means 46 is moved down to an adjacent connection apparatus name display 86 to specify a connection apparatus. Then, after completion of moving the inverted display 88, the operation proceeds to S638 "setting key pressed?".

[0129]

In S638, it is determined whether or not "setting key" arranged in the specifying means 48 has been pressed. In S638, if it is determined that "setting key" has not been pressed, the operation returns to S630 "↑key pressed?". If it is determined that "setting key" has been pressed, the operation proceeds to S640 "set connection apparatus", in which constants, flags and parameters for the model of connection apparatus are set.

[0130]

Subsequently, in S642 "transmit connection permission", the communication terminal 40 transmits to the electronic camera 10, a communication connection permission signal. Thereafter, the electronic camera 10 and the communication terminal 40 communicate with each other and thereby establish mutual authentication in S644 "authentication procedure". Thereafter, the communication continues.

[0131]

After completion of the above authentication procedure, in S646 "END", the procedure of connection with the electronic camera 10 is completed, and the operation returns to the original program routine.

[0132]

As described above, when the electronic camera 10 is set to the identification mode and enters the communication area of the communication terminal 40, the apparatus names of connectable apparatuses are displayed on the display means 46 of the communication terminal 40, and when the user selects and specifies a connection apparatus by use of the specifying means 48 including the arrow key and the like, the mutual authentication procedure is executed, whereby communication is established.

[0133]

Figure 15 illustrates a flowchart according to another embodiment when the electronic camera 10 and communication terminal 40 establish communication.

[0134]

The embodiment illustrated in Figure 15 is obtained by adding to the program of the communication terminal 40 illustrated in Figure 13, a connection prohibition denial setting mode so that wireless communication connection prohibition can be specified. Thus, descriptions of the flowchart parts of Figure 15 identical to those described in the embodiment of Figure 13 are omitted, and only different parts will be described below.

[0135]

In S644 "authentication procedure", when authentication procedure between the electronic camera 10 and communication terminal 40 is completed, the operation proceeds to S650 "denial setting mode?".

[0136]

In S650, it is determined whether or not a denial setting mode has been specified from the specifying means 48. In this case, it is preferable that the setting effect, setting method and procedure are displayed on the display means 46 to inform the user. In S650, if it is determined that the denial setting mode has not been specified, S650 is repeated; if it is determined that the denial setting mode has been specified, the operation proceeds to S652 "start denial setting display", in which identification information such as the appearance, name and the like of the connection apparatus stored in the PROM 64 is displayed on the display means 46.

[0137]

Figure 16 illustrates display contents 45 of connection apparatus identification information displayed on the display means 46 of the communication terminal 40.

[0138]

Referring to Figure 16, displayed on the display means 46 of the communication terminal 40 are remaining

battery charge display 82 indicating remaining charge of a battery being the power source of the communication terminal 40, received radio wave intensity display 84 indicating wirelessly received radio wave intensity, connection apparatus name display 86, inverted display 88 used to select the electronic camera 10 being a connection apparatus, and connection denial apparatus display 90 displaying a boxed name of a connection denial apparatus.

[0139]

Subsequently, in S654 "↑key pressed?", it is determined whether or not "↑key" arranged in the specifying means 48 has been pressed; if it is determined that "↑key" has been pressed, the operation proceeds to S656 "display UP", in which the connection denial apparatus display 90 currently displayed on the display means 46 is moved up to an adjacent connection apparatus name display 86. Then, after completion of moving the connection denial apparatus display 90, the operation proceeds to S662 "setting key pressed?".

[0140]

In S662, if it is determined that "↑key" has not been pressed, the operation proceeds to S658 "↓key pressed?", in which it is determined whether or not "↓key" arranged in the specifying means 48 has been pressed; if it is determined that "↓key" has been

pressed, the operation proceeds to S660 "display DOWN", in which the connection denial apparatus display 90 currently displayed on the display means 46 is moved down to an adjacent connection apparatus name display 86 for the purpose of specifying a connection apparatus. Then, after completion of moving the connection denial apparatus display 90, the operation proceeds to S662 "setting key pressed?".

[0141]

In S662, it is determined whether or not "setting key" arranged in the specifying means 48 has been pressed. In S662, if it is determined that "setting key" has not been pressed, the operation returns to S654 "↑key pressed?". If it is determined that "setting key" has been pressed, the operation proceeds to S664 "set denial apparatus", in which communication connection with the specified connection apparatus is prohibited, and then the operation proceeds to S666 "END", and returns to the original program routine.

[0142]

Figure 17 illustrates a flowchart according to another embodiment when the electronic camera 10 and communication terminal 40 establish communication.

[0143]

When the electronic camera 10 and the communication terminal 40 mutually enter a

communication area, the two apparatuses recognize this, and the program of the electronic camera 10 branches to S700 "START". Subsequently, in step S702 "start research mode", radio wave containing a search signal is radiated via the antenna 30 according to a command of the information processing means 14, whereby a processing of searching for a connection terminal 40 starts.

[0144]

In S704 "connectable apparatus exists?", if the electronic camera 10 receives a search signal outputted from the communication terminal 40, the electronic camera 10 receives a unique address from the communication terminal 40 to establish communication, and starts a processing of entering a new communication network and performing a connection handshake. In this case, the fact that communication is under way, and identification information such as the apparatus name and the like of the other party's connection apparatus or communication terminal may be displayed on the display means 32, so that the user can select a desired apparatus from among these.

[0145]

In S706 "connection acknowledgement received?", there is performed a processing of waiting for a "connection acknowledgement" signal to be wirelessly

transmitted from the communication terminal 40 to the electronic camera 10. If "connection acknowledgement" is not received, S706 is repeated; if "connection acknowledgement" is received, the operation proceeds to S708 "transmit connection start".

[0146]

Subsequently, in S708 "transmit connection start", there is transmitted a request command for performing "connection start" so that mutual authentication from the electronic camera 10 to the communication terminal 40 is automatically performed, and then the operation proceeds to S714 "connection permission received?".

[0147]

In S714 "connection permission received?", if it is determined that "connection permission" has not been received from the communication terminal 40, S714 is repeated; if it is determined that "connection permission" has been received from the communication terminal 40, the operation proceeds to S716 "authentication procedure", in which communication for authentication procedure is executed. Then, in S718 "END", the processing of communication connection with the communication terminal 40 is completed, and the operation returns to the original program routine.

[0148]

Meanwhile, in the processing program of the communication terminal 40, the following operation is performed. When the electronic camera 10 and the communication terminal 40 mutually enter a communication area, the two apparatuses recognize this, and the program of the communication terminal 40 branches to S720 "START". Subsequently, in step S722 "start research mode", the CPU 62 causes the wireless communication means 44 to radiate radio wave containing a search signal, whereby a processing of searching for a connection apparatus starts. In this case, information such as the apparatus name and the like of the electronic camera 10 which is under communication, or information such as the name of a connection apparatus which lies in another communication area in a communicatable manner, may be displayed, so that the user can select a desired apparatus from among the displayed ones.

[0149]

In S724 "connectable apparatus exists?", if the communication terminal 40 receives a search signal outputted from the electronic camera 10, the communication terminal 40 starts a processing of identifying the communication terminal 40 which has entered the new communication network, and assigning a unique address to the communication terminal 40 to

perform a connection handshake, whereby communication is established.

[0150]

Subsequently, in S728, a command "connection acknowledgement" indicating that communication is to be established is wirelessly transmitted from the communication terminal 40 to the electronic camera 10, and then the operation proceeds to S730 "connection start received?". In S730, there is performed a processing of waiting for a "connection start" request command to be transmitted from the communication terminal 40. When the electronic camera 10 transmits a "connection start" request command in S708 "transmit connection start" and then the communication terminal 40 receives this, the operation proceeds from S730 to S732 "transmit connection permission".

[0151]

In S732 "transmit connection permission", a communication connection permission signal is transmitted from the communication terminal 40 to the electronic camera 10. Thereafter, the electronic camera 10 and communication terminal 40 communicate with each other, and establish mutual authentication in S734 "authentication procedure".

[0152]

After completion of the above authentication procedure, in S736 "sound ringtone", the communication terminal 40 sounds a ringtone from the loudspeaker 50 to inform the user that communication connection has been established. Subsequently, the operation proceeds to S136 "END", in which the processing of connection with the electronic camera 10 is completed, and the operation returns to the original program routine.

[0153]

Described above was an example in which the fact that communication between the electronic camera 10 and communication terminal 40 has been established, is notified to the user through the sound emitted from the loudspeaker 50; but the present invention is not limited thereto. The user may be informed through some display, or lighting, blinking, vibration or the like of display.

[0154]

Figure 18 illustrates a flowchart according to another embodiment when the electronic camera 10 and communication terminal 40 illustrated in Figure 17 establish communication. When communication is established by the method illustrated in Figure 17, the processing of waiting for an authentication code of the electronic camera 10 continues. According to the method illustrated in Figure 18, however, after

communication has been established, "one-time mode" setting can be performed, that is, a mode in which mutual authentication is performed only once is provided. This "one-time mode" setting is useful when, as in commercial information, only one-time connection for information transmission is required and subsequent communication is not needed, thus allowing prevention of unwanted subsequent connection processings.

[0155]

Only parts of the flowchart of Figure 18 different from those of the flowchart of Figure 17 will be described, and an explanation of corresponding parts is omitted.

[0156]

The difference from the processing program of the electronic camera 10 illustrated in Figure 17 lies in the one-time mode setting part which is performed after S734 "authentication procedure" of Figure 17. After completion of the authentication procedure of the electronic camera 10 in S734, the operation proceeds to S740 "one-time mode set?", in which information for "one-time mode" setting is displayed on the display means 46 of the communication terminal 40 so that the user uses the specifying means 48 to make "one-time mode" setting. In S740 "one-time mode set?", if it is determined that "one-time mode" setting is made, the

operation proceeds to S742 "set authentication code prohibition", in which a setting for canceling the authentication code after execution of the initial communication is made, and then proceeds to S744 "END". In S740, if it is determined that "one-time mode" setting is not made, the operation directly proceeds to S744 "END", in which the processing of connection with the electronic camera 10 is completed, and the operation returns to the original program routine.

[0157]

Figure 19 illustrates a flowchart of continuing or canceling "one-time mode" in the communication terminal 40.

[0158]

When "one-time mode" continuation or cancellation is specified, the program jumps to S750 "START". Subsequently, in S752 "one-time mode cancellation mode?", it is determined whether or not "one-time cancellation" has been specified by the user; if it is determined that "one-time cancellation" has not been specified, the operation proceeds to S756 "END"; if it is determined that "one-time cancellation" has been specified, the operation proceeds to S754 "restore prohibited authentication code", in which the authentication code which has been prohibited in S742 of Figure 18 is restored, and a processing of

establishing communication is performed, and then the operation returns to the original program routine.

[0159]

Figure 20 illustrates a flowchart according to another embodiment when the electronic camera 10 and communication terminal 40 illustrated in Figure 17 establish communication. When communication is established by the method illustrated in Figure 17, the communication terminal 40 emits a ringtone, so that the connection is identified. According to the connection method illustrated in Figure 20, however, when an authentication procedure is performed after the first communication connection, a common key is used to provide identification information for the user, and when an authentication procedure is performed after the second communication connection, a unique key is issued to provide identification information for the user.

[0160]

The processing program of the electronic camera 10 illustrated in Figure 20 is identical to the flowchart illustrated in Figure 17, and hence an explanation thereof is omitted.

[0161]

Only parts of the flowchart of the communication terminal 40 of Figure 20 different from those of the flowchart of Figure 17 will be described, and an

explanation of corresponding parts is omitted. In S732 "transmit connection permission", when the communication terminal 40 transmits "connection permission" to the electronic camera 10, the program proceeds to S760 "first connection?". In S760, it is determined whether or not this connection is first one; if it is determined that this connection is first one, the operation proceeds to S762 "issue authentication procedure common key", in which an authentication procedure is performed with respect to the electronic camera 10 and at the same time, a "common key" is issued, so that communication connection is established only when the common key is pressed. After completion of the processing in S762, the operation proceeds to S764 "END", and returns to the original program routine.

[0162]

If it is determined that this connection is not first one, the operation proceeds to S766 "second connection?"; if it is determined that this connection is second one in S766, the operation proceeds to S768 "issue authentication procedure unique key", in which an authentication procedure is performed with respect to the electronic camera 10 and at the same time, a "unique key" is issued, so that communication connection is established only when the unique key is pressed. After completion of the processing in S768,

the operation proceeds to S764 "END", and returns to the original program routine.

[0163]

If it is determined that this connection is not second one (this connection is third or later one) in S766, the operation proceeds to S772 "unique key?", in which it is determined whether or not the unique key previously issued in S768 has been pressed; if it is determined that the pressed key is not the unique key issued in S768, the operation proceeds to S764 "END", and returns to the original program routine; if it is determined that the pressed key is the unique key issued in S768, the operation proceeds to S772 "authentication procedure", in which authentication procedure is performed with respect to the electronic camera 10, so that communication connection is established. After completion of the processing in S772, the operation proceeds to S764 "END", and returns to the original program routine.

[0164]

As described above, since a common key or unique key issued when connection is made is used for identification, it is possible to easily identify the user.

[0165]

[Advantages of the Invention]

As described above, according to the inventive destination apparatus selection method for a wireless LAN, when a connected apparatus and a connection apparatus enter a wireless communication area, communication starts automatically, the connected apparatus receives from the connection apparatus, identification information allowing identifying the connection apparatus, and the identification information for identifying the connection apparatus is displayed on display means of the connected apparatus, and when a desired connection apparatus is specified from among the displayed contents, wireless connection is established between the connection apparatus and the connected apparatus. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0166]

According to another embodiment of the present invention, wireless connection is established between a connection apparatus and a connected apparatus, depending on how a key arranged in the connection apparatus and a key arranged in the connected apparatus are pressed. Thus, a desired connection apparatus can be selected for communication from among multiple

connection apparatuses lying in the communication area of the connected apparatus.

[0167]

According to another embodiment of the present invention, when a predetermined key arranged in a connection apparatus and a predetermined key arranged in a connected apparatus are pressed substantially around the same time, wireless connection is established between the connection apparatus and the connected apparatus. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0168]

According to another embodiment of the present invention, when a predetermined key arranged in a connection apparatus and a predetermined key arranged in a connected apparatus are pressed in a preliminarily set predetermined order, wireless connection is established between the connection apparatus and the connected apparatus. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0169]

According to another embodiment of the present invention, when a connected apparatus receives sound unique to a connection apparatus emitted from the connection apparatus, wireless connection is established between the connection apparatus and the connected apparatus. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0170]

According to another embodiment of the present invention, a connection apparatus takes a picture of contents displayed on display means of a connected apparatus to detect the displayed contents of the connected apparatus, and when the displayed contents are predetermined ones, wireless connection is established between the connection apparatus and the connected apparatus. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0171]

According to another embodiment of the present invention, when a connection apparatus is brought into contact with a connected apparatus, the connection apparatus and the connected apparatus identify each

other to establish wireless connection. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0172]

According to another embodiment of the present invention, when a connection apparatus and a connected apparatus enter a communicatable area, wireless connection is automatically established, and when the establishing of wireless connection is achieved, sound, light or vibration is emitted from notification means arranged in the connected apparatus to notify a user that wireless connection has been established. Thus, it can be easily perceived that a desired connection apparatus has been selected from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0173]

According to another embodiment of the present invention, when a connection apparatus and a connected apparatus enter a communicatable area, communication starts automatically; when the connection is first one, common key information to be used for authentication is transmitted to the connection apparatus, and when it is detected that a common key arranged in the connection

apparatus and a common key arranged in the connected apparatus have been pressed, wireless connection is established; when the connection is second one, predetermined key information to be used for authentication is transmitted to the connection apparatus, and when it is detected that a predetermined key arranged in the connection apparatus and a predetermined key arranged in the connected apparatus have been pressed, the information is perceived as information for identifying the user, so that the communication is continued; and when the connection is third or later one, when it is detected that a predetermined key arranged in the connection apparatus and a predetermined key arranged in the connected apparatus have been pressed, the user is identified and at the same time the communication is continued. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus.

[0174]

According to another embodiment of the present invention, when a connection apparatus and a connected apparatus enter a communicatable area, mutual authentication is automatically performed to establish wireless connection, and the user can specify by use of

specifying means arranged in the connection apparatus, from among a mode in which mutual authentication is limited to first one and a mode in which mutual authentication is also performed for the second time or more. Thus, a desired connection apparatus can be selected for communication from among multiple connection apparatuses lying in the communication area of the connected apparatus and at the same time, unwanted communication can be prevented.

[Brief Description of the Drawings]

[Figure 1]

A perspective view of an electronic camera capable of wirelessly connecting with a wireless communication terminal

[Figure 2]

A back view of the electronic camera

[Figure 3]

A block diagram of the electronic camera

[Figure 4]

An external view of the communication terminal

[Figure 5]

A block diagram of the communication terminal

[Figure 6]

A flowchart when the electronic camera and communication terminal establish communication

[Figure 7]

A flowchart according to another embodiment when  
the electronic camera and communication terminal  
establish communication

[Figure 8]

A flowchart according to another embodiment when  
the electronic camera and communication terminal  
establish communication

[Figure 9]

A flowchart according to another embodiment when  
the electronic camera and communication terminal  
establish communication

[Figure 10]

A view illustrating the state in which the  
electronic camera takes a picture of "identification  
figure" displayed on display means of the communication  
terminal

[Figure 11]

A flowchart according to another embodiment when  
the electronic camera and communication terminal  
establish communication

[Figure 12]

A flowchart according to another embodiment when  
the electronic camera and communication terminal  
establish communication

[Figure 13]

A flowchart according to another embodiment when  
the electronic camera and communication terminal  
establish communication

[Figure 14]

A view illustrating connection apparatus  
information displayed on the display means of the  
communication terminal

[Figure 15]

A flowchart according to another embodiment when  
the electronic camera and communication terminal  
establish communication

[Figure 16]

A view illustrating connection apparatus  
information displayed on the display means of the  
communication terminal

[Figure 17]

A flowchart according to another embodiment when  
the electronic camera and communication terminal  
establish communication

[Figure 18]

A flowchart according to another embodiment when  
the electronic camera and communication terminal  
establish communication

[Figure 19]

A flowchart according to another embodiment when  
the electronic camera and communication terminal  
establish communication

[Figure 20]

A flowchart according to another embodiment when  
the electronic camera and communication terminal  
establish communication

[Description of Symbols]

- 2 Release button
- 4 Image taking lens
- 6 Mode selection dial
- 8 Arrow key
- 9 Finder
- 10 Electronic camera
- 12 Imaging means
- 13 buzzer
- 14 Information processing means
- 15 Vibration detection means
- 16 Image processing means
- 18 Frame memory
- 19 Input means
- 20 Compression/decompression means
- 22 Recording medium
- 24 Recording medium interface
- 26 Memory
- 28 Transmission/reception means

30 Antenna  
32 Display means  
34 D/A converter  
36 Character generator  
40 Communication terminal  
42 Antenna  
44 Wireless communication means  
45 Display contents  
46 Display means  
48, 48 Specifying means  
50 Loudspeaker  
52 Microphone  
54 Wireless communication means  
56 Transmission/reception means  
58 Transmission/reception means  
60 Transmission/reception buffer  
62 CPU  
64 PROM  
66 RAM  
82 Remaining battery charge display  
84 Radio wave intensity display  
86, 86 Name display  
88 Inverted display  
90 connection denial apparatus display

Figure 4

- #1 IMAGE SELECTION
- #2 MENU
- #3 TELEPHONE DIRECTORY, SET, MENU
- #4 CALL, CLEAR, DISCONNECT

Figure 10

- #1 IMAGE SELECTION
- #2 NAME OF CONNECTION APPARATUS
- #3 MENU
- #4 TELEPHONE DIRECTORY, SET, MENU
- #5 CALL, CLEAR, DISCONNECT

Figure 3

- 10 ELECTRONIC CAMERA BODY
- 12 IMAGING MEANS
- 13 BUZZER
- 14 INFORMATION PROCESSING MEANS
- 15 VIBRATION DETECTION MEANS
- 16 IMAGE PROCESSING MEANS
- 18 FRAME MEMORY
- 19 INPUT MEANS
- 20 COMPRESSION/DECOMPRESSION MEANS
- 22 RECORDING MEDIUM
- 24 RECORDING MEDIUM INTERFACE
- 26 MEMORY

28 TRANSMISSION/RECEPTION MEANS  
30 ANTENNA  
32 DISPLAY MEANS  
34 D/A CONVERTER  
36 CHARACTER GENERATOR

Figure 5

40 COMMUNICATION TERMINAL  
44 WIRELESS COMMUNICATION MEANS (FOR PERIPHERAL APPARATUS)  
46 DISPLAY MEANS  
    IMAGE DISPLAY  
    CHARACTER DISPLAY  
48 SPECIFYING MEANS  
54 WIRELESS COMMUNICATION MEANS (FOR PUBLIC LINE)  
56 TRANSMISSION/RECEPTION MEANS  
58 TRANSMISSION/RECEPTION MEANS  
60 TRANSMISSION/RECEPTION BUFFER

Figure 6

S102 START SEARCH MODE  
S104 CONNECTABLE APPARATUS EXISTS?  
S106 CONNECTION ACKNOWLEDGEMENT RECEIVED?  
S108 ↑KEY PRESSED?  
S110 SEND NO-KEY REPLY  
S112 SEND PRESSED-KEY REPLY

S114 CONNECTION PERMISSION RECEIVED?  
S116 AUTHENTICATION PROCEDURE  
S122 START SEARCH MODE  
S124 CONNECTABLE APPARATUS EXISTS?  
S126 ↑KEY PRESSED?  
S128 TRANSMIT CONNECTION ACKNOWLEDGEMENT  
S130 PRESSED-KEY RECEIVED?  
S132 TRANSMIT CONNECTION PERMISSION  
S134 AUTHENTICATION PROCEDURE  
#1 ELECTRONIC CAMERA  
#2 COMMUNICATION TERMINAL

Figure 7

S202 START KEY SETTING  
S204 KEY PRESSED?  
S206 STORE KEY ORDER  
S208 KEY SETTING COMPLETED?  
S210 START SEARCH MODE  
S212 CONNECTABLE APPARATUS EXISTS?  
S214 KEY ORDER RECEIVED?  
S216 IDENTICAL ORDER  
S218 SEND DISCREPANCY REPLY  
S220 SEND CORRESPONDENCE REPLAY  
S222 CONNECTION PERMISSION RECEIVED?  
S224 AUTHENTICATION PROCEDURE  
S232 START SEARCH MODE

S234 CONNECTABLE APPARATUS EXISTS?  
S236 KEY PRESSED?  
S238 STORE KEY ORDER  
S240 KEY SETTING COMPLETED?  
S242 TRANSMIT KEY ORDER  
S244 CORRESPONDENCE RECEIVED?  
S246 TRANSMIT CONNECTION PERMISSION  
S248 AUTHENTICATION PROCEDURE  
#1 ELECTRONIC CAMERA  
#2 COMMUNICATION TERMINAL

Figure 8

S302 START SEARCH MODE  
S304 CONNECTABLE APPARATUS EXISTS?  
S306 CONNECTION ACKNOWLEDGEMENT RECEIVED?  
S308 RING BUZZER  
S310 BUZZER ACKNOWLEDGED?  
S312 SEND BUZZER REPLY  
S314 CONNECTION PERMISSION RECEIVED?  
S316 AUTHENTICATION PROCEDURE  
S322 START SEARCH MODE  
S324 CONNECTABLE APPARATUS EXISTS?  
S326 START KEY PRESSED?  
S328 TRANSMIT CONNECTION ACKNOWLEDGEMENT  
S330 BUZZER SOUND DETECTED?  
S332 TRANSMIT BUZZER ACKNOWLEDGEMENT

S334 BUZZER REPLY?  
S336 TRANSMIT CONNECTION PERMISSION  
S338 AUTHENTICATION PROCEDURE  
#1 ELECTRONIC CAMERA  
#2 COMMUNICATION TERMINAL

Figure 9

S402 START SEARCH MODE  
S404 PROHIBIT STROBE  
MICRO POSITION  
MOVIE THROUGH  
S406 CONNECTION ACKNOWLEDGEMENT FIGURE?  
S408 STOP MOVIE THROUGH  
S410 TRANSMIT FIGURE IDENTIFICATION  
S412 CONNECTION PERMISSION RECEIVED?  
S414 AUTHENTICATION PROCEDURE  
S422 START SEARCH MODE  
S424 DISPLAY CONNECTION ACKNOWLEDGEMENT FIGURE  
S426 IDENTIFICATION DETECTED?  
S428 TRANSMIT CONNECTION PERMISSION  
S430 AUTHENTICATION PROCEDURE  
#1 ELECTRONIC CAMERA  
#2 COMMUNICATION TERMINAL

Figure 11

S402 START SEARCH MODE

S404 PROHIBIT STROBE  
MICRO POSITION  
MOVIE THROUGH  
S407 ACKNOWLEDGEMENT BLINKING PERIOD  
S408 STOP MOVIE THROUGH  
S410 TRANSMIT FIGURE IDENTIFICATION  
S412 CONNECTION PERMISSION RECEIVED?  
S414 AUTHENTICATION PROCEDURE  
S422 START SEARCH MODE  
S425 DISPLAY CONNECTION ACKNOWLEDGEMENT BLINKING  
S426 ACKNOWLEDGEMENT DETECTED?  
S427 STOP BLINK  
S428 TRANSMIT CONNECTION PERMISSION  
S430 AUTHENTICATION PROCEDURE  
#1 ELECTRONIC CAMERA  
#2 COMMUNICATION TERMINAL

Figure 12

S502 START SEARCH MODE  
S504 START MONITORING VIBRATION  
S506 IMPACT DETECTED?  
S508 STOP MONITORING VIBRATION  
S510 TRANSMIT IMPACT IDENTIFICATION  
S512 CONNECTION PERMISSION RECEIVED?  
S514 AUTHENTICATION PROCEDURE  
S522 START SEARCH MODE

S524 MONITOR MICROPHONE INPUT  
S526 IMPACT SOUND DETECTED?  
S528 IMPACT IDENTIFICATION DETECTED?  
S530 TRANSMIT CONNECTION PERMISSION  
S532 AUTHENTICATION PROCEDURE  
#1 ELECTRONIC CAMERA  
#2 COMMUNICATION TERMINAL

Figure 13

S602 START SEARCH MODE  
S604 PRODUCT NAME REQUEST?  
S606 TRANSMIT PRODUCT NAME  
S608 CONNECTION PERMISSION RECEIVED?  
S610 AUTHENTICATION PROCEDURE  
S622 START SEARCH MODE  
S624 TRANSMIT PRODUCT NAME REQUEST  
S626 PRODUCT NAME RECEIVED?  
S628 DISPLAY PRODUCT NAME  
S630 ↑KEY PRESSED?  
S632 MOVE UP DISPLAY  
S634 ↓KEY PRESSED?  
S636 MOVE DOWN DISPLAY  
S638 SETTING KEY PRESSED?  
S640 SET CONNECTION APPARATUS  
S642 TRANSMIT CONNECTION PERMISSION  
S644 AUTHENTICATION PROCEDURE

#1 ELECTRONIC CAMERA  
#2 COMMUNICATION TERMINAL

Figure 14

#1 DESTINATION APPARATUS?  
#2 MENU  
#3 TELEPHONE DIRECTORY, SET, MENU  
#4 CALL, CLEAR, DISCONNECT

Figure 16

#1 DESTINATION APPARATUS?  
#2 MENU  
#3 SELECT BY↑↓  
#4 TELEPHONE DIRECTORY, SET, MENU  
#5 CALL, CLEAR, DISCONNECT

Figure 15

S622 START SEARCH MODE  
S624 TRANSMIT PRODUCT NAME REQUEST  
S626 PRODUCT NAME RECEIVED?  
S628 DISPLAY PRODUCT NAME  
S630 ↑KEY PRESSED?  
S632 MOVE UP DISPLAY  
S634 ↓KEY PRESSED?  
S636 MOVE DOWN DISPLAY  
S638 SETTING KEY PRESSED?

S640 SET CONNECTION APPARATUS  
S642 TRANSMIT CONNECTION PERMISSION  
S644 AUTHENTICATION PROCEDURE  
S650 DENIAL SETTING MODE?  
S652 START DENIAL SETTING DISPLAY  
S654 ↑KEY PRESSED?  
S656 MOVE UP DISPLAY  
S658 ↓KEY PRESSED?  
S660 MOVE DOWN DISPLAY  
S662 SETTING KEY PRESSED?  
S664 SET DENIAL APPARATUS  
#1 COMMUNICATION TERMINAL

Figure 17

S702 START SEARCH MODE  
S704 CONNECTABLE APPARATUS EXISTS?  
S706 CONNECTION ACKNOWLEDGEMENT RECEIVED?  
S708 TRANSMIT CONNECTION START  
S714 CONNECTION PERMISSION RECEIVED?  
S716 AUTHENTICATION PROCEDURE  
S722 START SEARCH MODE  
S724 CONNECTABLE APPARATUS EXISTS?  
S728 TRANSMIT CONNECTION ACKNOWLEDGEMENT  
S730 CONNECTION START RECEIVED?  
S732 TRANSMIT CONNECTION PERMISSION  
S734 AUTHENTICATION PROCEDURE

S736 SOUND RINGTONE

#1 ELECTRONIC CAMERA

#2 COMMUNICATION TERMINAL

Figure 18

S722 START SEARCH MODE

S724 CONNECTABLE APPARATUS EXISTS?

S728 TRANSMIT CONNECTION ACKNOWLEDGEMENT

S730 CONNECTION START RECEIVED?

S732 TRANSMIT CONNECTION PERMISSION

S734 AUTHENTICATION PROCEDURE

S740 ONE-TIME MODE?

S742 SET AUTHENTICATION CODE PROHIBITION

#1 COMMUNICATION TERMINAL

Figure 19

S752 ONE-TIME CANCELLATION MODE?

S754 RESTORE PROHIBITED AUTHENTICATION CODE

#1 COMMUNICATION TERMINAL

Figure 20

S702 START SEARCH MODE

S704 CONNECTABLE APPARATUS EXISTS?

S706 CONNECTION ACKNOWLEDGEMENT RECEIVED?

S708 TRANSMIT CONNECTION START

S714 CONNECTION PERMISSION RECEIVED?

S716 AUTHENTICATION PROCEDURE  
S722 START SEARCH MODE  
S724 CONNECTABLE APPARATUS EXISTS?  
S728 TRANSMIT CONNECTION ACKNOWLEDGEMENT  
S730 CONNECTION START RECEIVED?  
S732 TRANSMIT CONNECTION PERMISSION  
S760 FIRST CONNECTION?  
S762 ISSUE AUTHENTICATION PROCEDURE COMMON KEY  
S766 SECOND CONNECTION  
S768 ISSUE AUTHENTICATION PROCEDURE UNIQUE KEY  
S770 UNIQUE KEY  
S772 AUTHENTICATION PROCEDURE